ONTARIO MINISTRY OF ENVIRONMENT
36936000023764

1970

OPERATING SUMMARY

BURLINGTON

Elizabeth Gardens

water pollution control plant

TD
367
.A56
B875
1970
MOE

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TD
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B875
1970

Burlington Elizabeth Gardens :
water pollution control plant.
81588

Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 195
Ontario

Once again we have the privilege of submitting to you our latest detailed report on financial progress and technical activity at your water pollution control plant.

The statistical information contained in this annual operating summary will undoubtedly be a useful barometer of efficiency. Of particular interest will be the comments and recommendations of the regional operations engineer, who was intimately connected with day-to-day operation throughout 1970.

Together with the extensive cost data provided, this information should assist greatly in your general understanding of the problems met and dealt with, and in furnishing a yardstick for possible future expansion.

DSCaverly

D. S. Caverly,
General Manager.

DMcTavish

D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

Environment Ontario
[illegible]
[illegible]
Etobicoke, Ontario [illegible]
Canada

TD
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135 St. Clair Avenue West
Toronto 195

BURLINGTON
Elizabeth Gardens
water pollution control plant

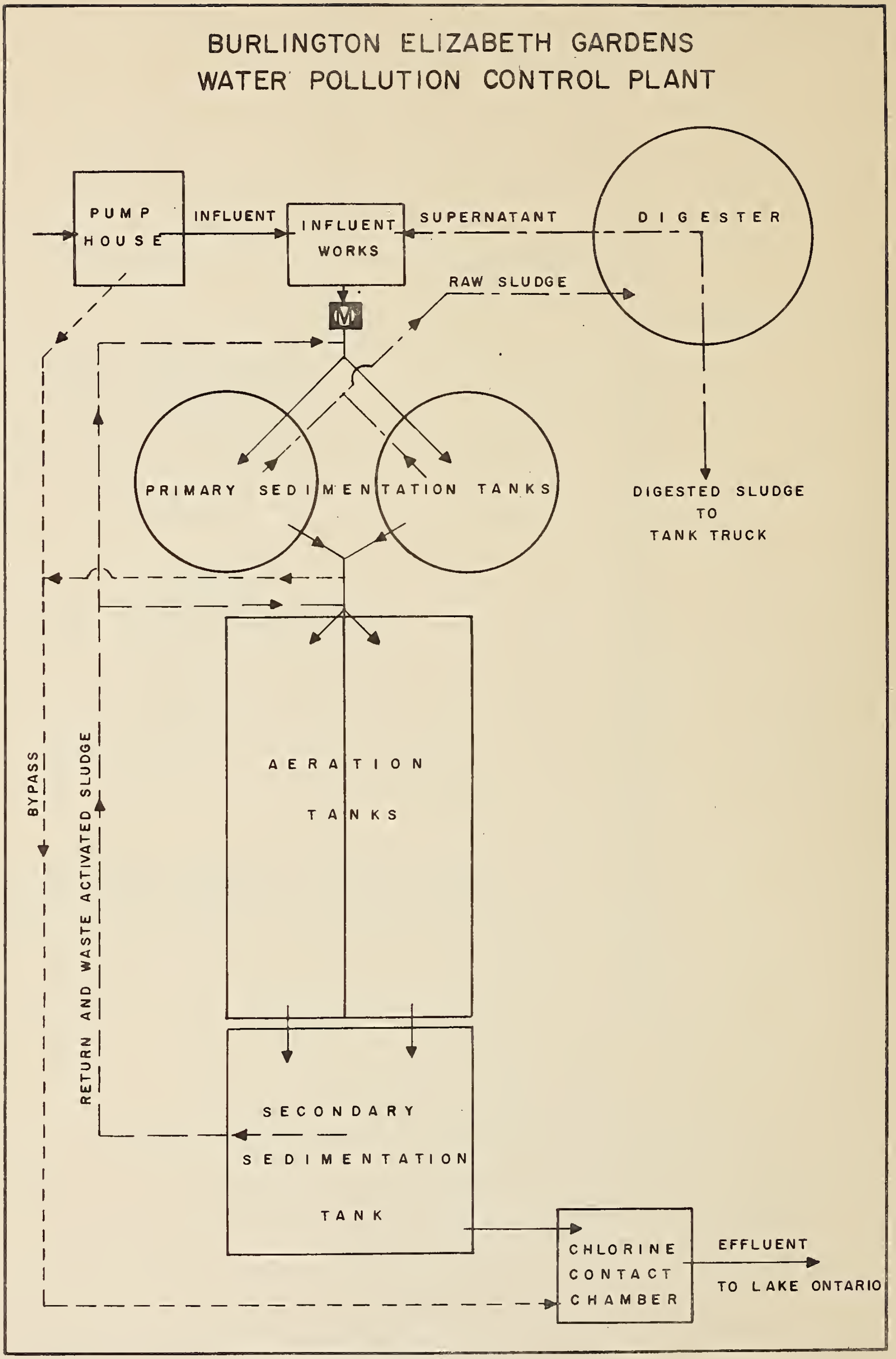
operated for

THE TOWN OF BURLINGTON

by the

ONTARIO WATER RESOURCES COMMISSION

1970 ANNUAL OPERATING SUMMARY



BURLINGTON ELIZABETH GARDENS
WATER POLLUTION CONTROL PLANT

DESIGN DATA

PROJECT NO.	2-0028-58	TREATMENT	Activated Sludge
DESIGN FLOW	0.750 mgd	DESIGN POPULATION	7,500
BOD - Raw Sewage - Removal	253 mg/l 90-95%	SS - Raw Sewage - Removal	280 mg/l 95%

LIFE STATION

Pumps (@ 35' tdh)

One Fairbanks-Morse	600 gpm (electric)
One Smart-Turner	250 gpm (electric)
One Smart-Turner	125 gpm (electric)
One Smart-Turner	300 gpm (gas)

PRIMARY TREATMENT

Comminution

Type: Barminutor
Size: Model B (18")

Grit Removal

Type: Air degritter (with 4 Colaflex diffusers)
Size: 14' x 8' x 7' (avg depth)
Retention: 10 min

Primary Sedimentation

Type: Dorr
Size: Two 22' dia x 9' swd (6250 gal)
Retention: 2 hours
Loading: Surface, 980 gal/ft^2/day
Weir, 5,430 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air, Single-pass
Size: Two 98' x $19\frac{1}{2}$' x 12' (44,000 cu ft or 274,000 gal)
Retention: 8.8 hours

Air Supply

Two Hoffman Cyclo Blowers
Size: 750 cfm each

Diffusers

60 Colaflex diffusers per tank

Secondary Sedimentation

Type: Dorr
Size: Two 40' x 40' x 10' swd (8,600 gal)
Retention: 2.75 hours
Loading: Surface, 470 gal/ft^2/day
Weir, 4,690 gal/ft/day

CHLORINATION

W & T 200 lb/day

Chlorine Contact Chamber

Retention: 10 min

OUTFALL

- to Lake Ontario

SLUDGE HANDLING

Digestion System

Type: Single-stage with one Dorr-Oliver draft tube mixer
Size: One 45' dia x 20' swd (31,600 cu ft or 196,000 gal)
Loading: 1.6 lb/ft^3/mo

'70 REVIEW

GENERAL

Modifications to pumping station No. 6 to increase its capacity to handle flows presently directed to the hydraulically overloaded Elizabeth Gardens plant and to divert these flows to the Skyway plant started in October. It is anticipated that the work will be completed by April 1971.

Repairs to the digester roof were completed during the year at a fraction of the cost for a complete roof replacement (which was originally contemplated). The digester was returned to operation in October and is functioning satisfactorily. It is anticipated that the repairs will suffice for the life of the plant which is estimated to be 3 to 5 years.

EXPENDITURES

The 1970 operating costs were $26,161.31, a decrease of 9% from 1969.

FLOWS	DAILY FLOW mil gal	OCCURRING IN THE MONTH OF	MONTHLY FLOW mil gal	OCCURRING IN THE MONTH OF
Average	1.2	—	35.9	—
High	2.6	April	46.4	April
Low	.3	January	28.3	January

PLANT FLOWS and CHLORINATION

A total flow of 430.7 million gallons was treated, an increase of approximately 10% over the previous year's flow. The average daily flow of 1.2 million gallons was 160% of the plant's design capacity of 0.75 mgd.

An average chlorine dosage (May 15 - October 15) of 2.8 mg/l was required to maintain a 15 minute chlorine residual of 0.5 mg/l in the treated effluent.

PLANT EFFICIENCY

The average raw sewage BOD and suspended solids concentrations were 146 mg/l and 209 mg/l respectively. This represents an increase in raw sewage strength of 15% BOD and 39% suspended solids over the previous year. The process removal efficiency of 89% BOD and 94% suspended solids was similar to the previous year. The effluent quality of 16 mg/l BOD and 13 mg/l suspended solids was satisfactory.

AERATION

The average loading to the aeration section was 0.28 pounds of BOD per day per pound of MLSS - an increase of approximately 22% over 1969. The average volume of air required to remove 1.0 pounds of BOD was 1,800 cubic feet. The average MLSS concentration increased from 2,123 mg/l in 1969 to 2,409 mg/l in 1970.

SLUDGE DIGESTION

The digester was out of operation for 9 months of the year for repairs and during that period raw sludge was hauled from the plant. The digester was returned to operation in October and no further sludge was hauled from the plant during the year.

A total of 3,266 cubic yards of raw sludge was trucked from the plant.

CONCLUSIONS

Despite a hydraulic overload of 60%, a satisfactory effluent was produced most of the time.

Modifications to pumping station No. 6 to increase its capacity and to direct flows from the Elizabeth Gardens plant to the Skyway plant started in October 1970 and will be completed early in 1971.

Repairs to the digester roof were completed in October and the digester was returned to operation at that time.

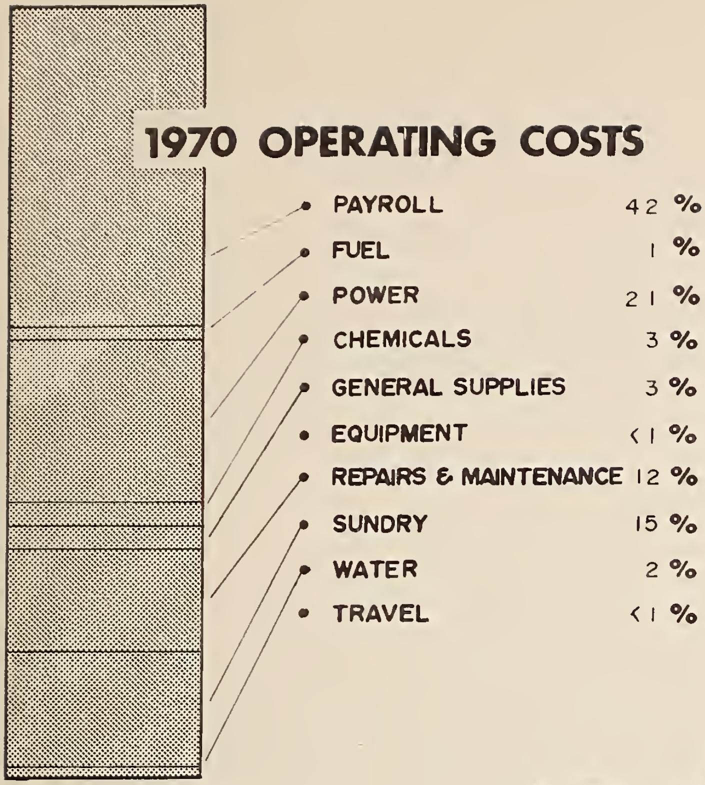
PROJECT COSTS

NET CAPITAL COST (Final)	$382,773.39
DEDUCT - Portion financed by CMHC/MDLB (Final)	-
Long Term Debt to OWRC	$382,773.39
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1970	$200,526.15

Net Operating	$ 30,019.01
Debt Retirement	13,887.00
Reserve	1,487.44
Interest Charged	21,445.34
TOTAL	$ 66,838.79

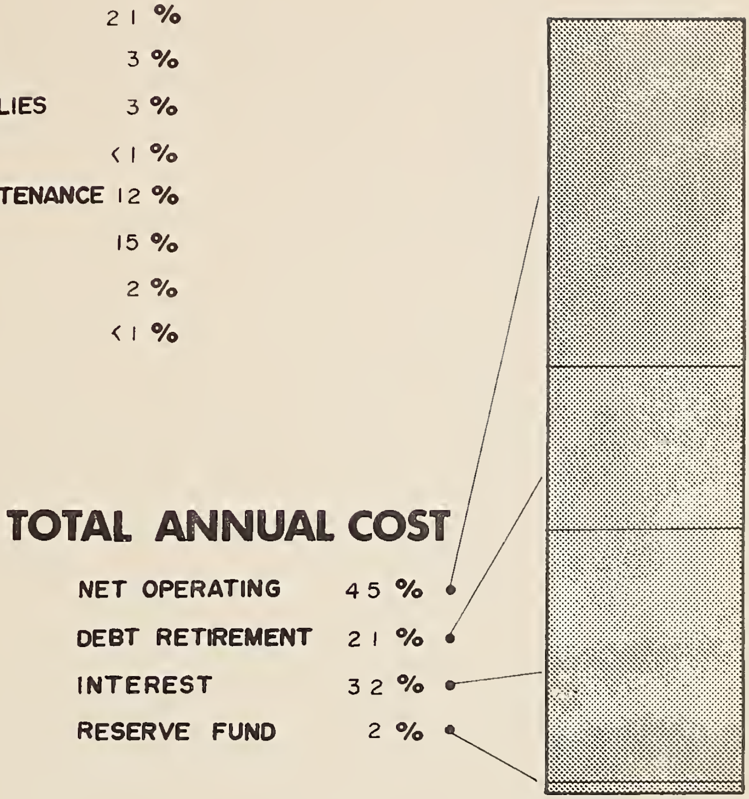
RESERVE ACCOUNT

Balance @ January 1, 1970	$ 19,338.79
Deposited by Municipality	1,487.44
Interest Earned	1,280.25
	$ 22,106.48
Less Expenditures	1,434.92
Balance @ December 31, 1970	$ 20,671.56



1970 OPERATING COSTS

PAYROLL	42 %
FUEL	1 %
POWER	21 %
CHEMICALS	3 %
GENERAL SUPPLIES	3 %
EQUIPMENT	<1 %
REPAIRS & MAINTENANCE	12 %
SUNDRY	15 %
WATER	2 %
TRAVEL	<1 %



TOTAL ANNUAL COST

NET OPERATING	45 %
DEBT RETIREMENT	21 %
INTEREST	32 %
RESERVE FUND	2 %

Yearly Operating Costs

YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER MILLION GAL	COST PER LB OF BOD REMOVED
1966	297.76	$23,894.31	$80.25	7 cents
1967	383.66	24,427.22	63.67	7 cents
1968	388.37	22,110.92	56.93	5 cents
1969	390.30	28,721.33	73.58	6 cents
1970	430.7	26,161.31	60.70	5 cents

MONTHLY OPERATING COSTS

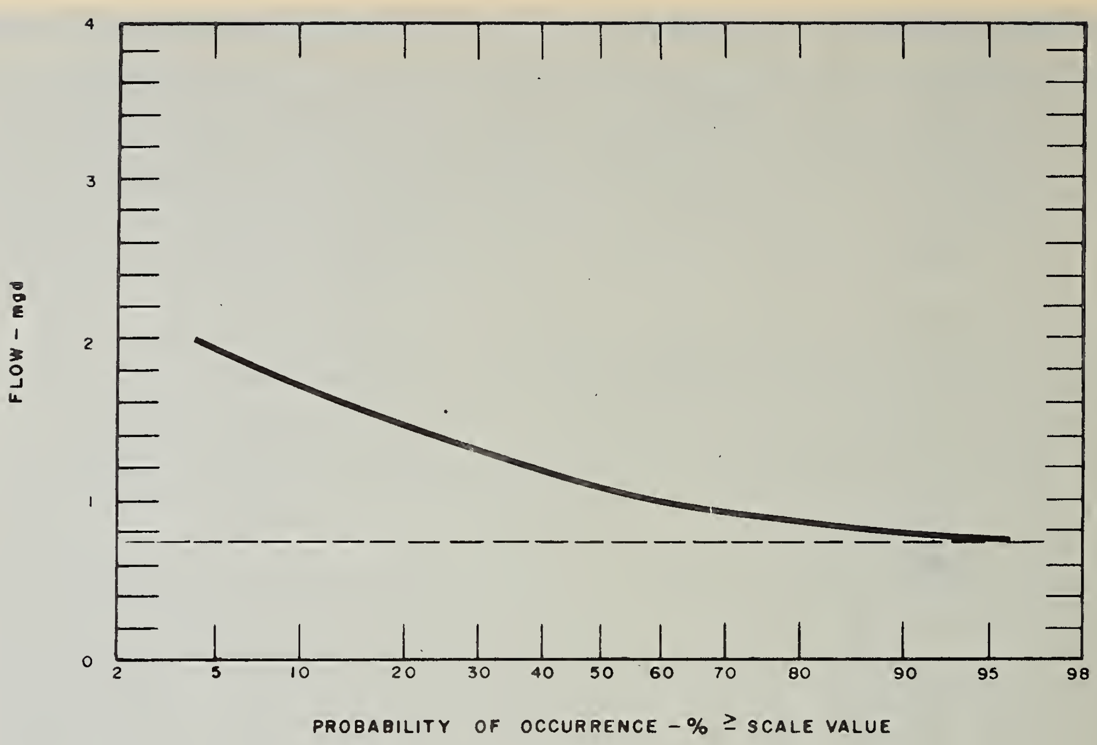
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY *	WATER	TRAVEL
JAN	1848.33	1192.67	-	105.03	485.92	-	-	-	-	15.67	49.04	-
FEB	1906.54	866.89	-	-	489.12	-	116.86	-	260.09	105.64	49.04	18.90
MAR	1624.55	575.30	-	52.60	451.84	-	39.38	-	55.52	400.87	49.04	-
APR	1392.33	561.09	-	-	459.48	-	48.41	-	110.42	163.89	49.04	-
MAY	2148.25	1365.56	-	-	415.06	-	121.92	-	85.00	111.67	49.04	-
JUNE	1271.32	634.08	-	-	370.82	-	2.67	-		214.71	49.04	-
JULY	2026.11	825.70	-	-	372.36	290.59	10.79	-	89.96	387.67	49.04	-
AUG	2456.80	843.10	-	-	418.88	145.30	99.61	-	363.00	537.87	49.04	-
SEPT	2310.29	566.91	-	-	340.36	145.30	100.75	137.76	57.73	912.44	49.04	-
OCT	3620.18	1100.32	-	-	373.96	290.59	22.61	-	1251.32	532.34	49.04	-
NOV	1337.87	510.51	-	-	430.20	-	4.73	-	309.67	33.72	49.04	-
DEC	4218.74	1787.85	-	162.18	905.06	-	192.85	-	529.05	519.37	98.08	24.30
TOTAL	26161.31	10829.98	-	319.81	5513.06	871.78	760.58	137.76	3111.76	3935.86	637.52	43.20

BRACKETS INDICATE CREDIT

* SUNDRY INCLUDES SLUDGE HAULAGE COSTS WHICH WERE $5056.25

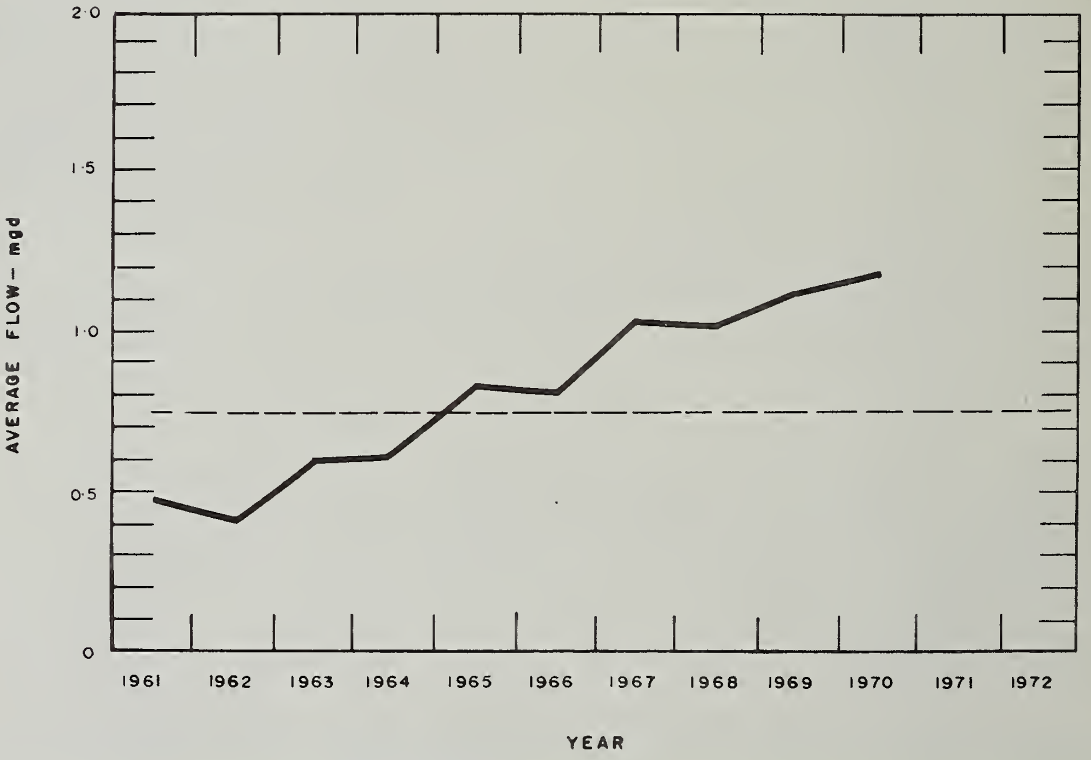
Note: Total does not include year-end adjustments.

PROCESS DATA



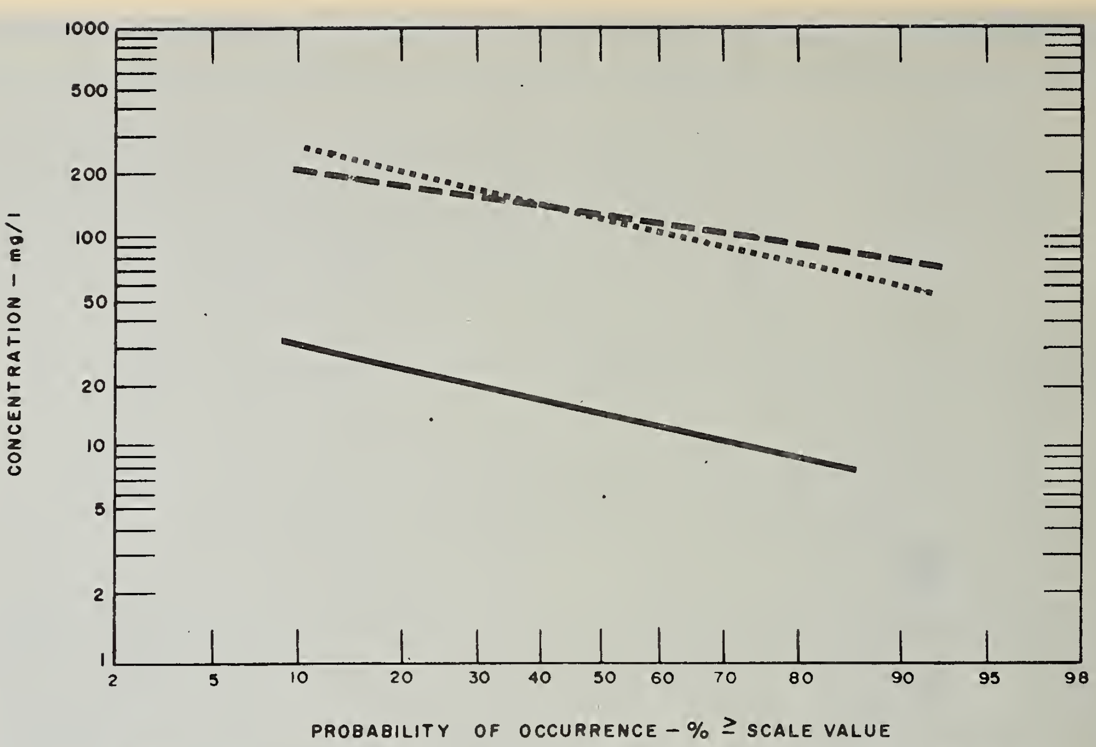
FLOWS

NOMINAL CAPACITY ——— ——— ———



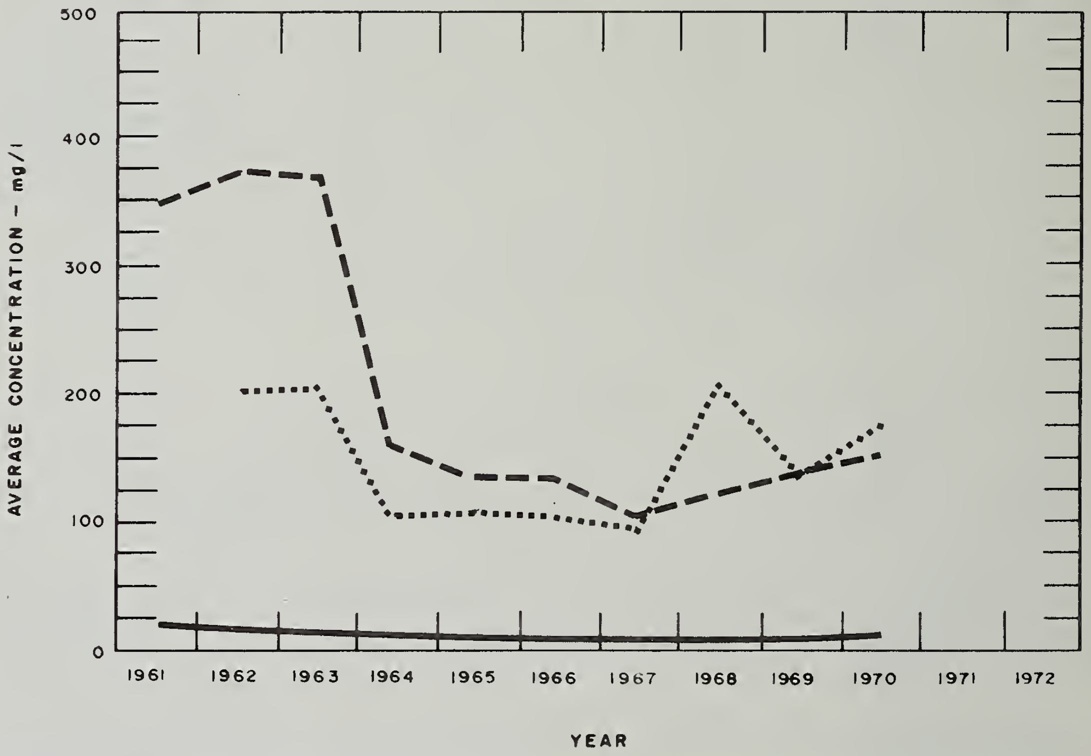
PLANT FLOWS and CHLORINATION

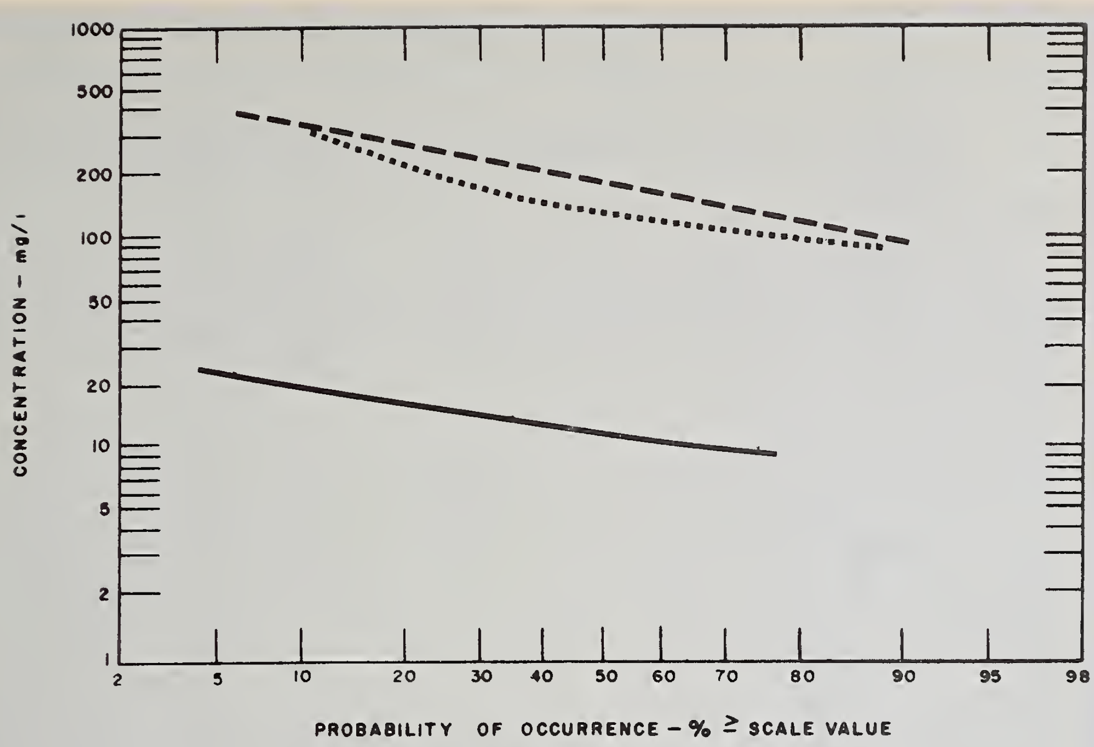
MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	CHLORINE USED pounds	DOSAGE mg/l
JAN	28.3	.91	2.2	.3	0	0
FEB	38.0	1.36	2.2	1.0	0	0
MAR	42.6	1.38	2.4	1.0	0	0
APR	46.4	1.54	2.6	1.0	0	0
MAY	33.3	1.08	1.8	.7	460	2.6
JUNE	28.5	.95	1.5	.7	890	3.1
JULY	31.8	1.03	1.6	.8	970	3.0
AUG	32.0	1.03	1.7	.8	950	3.0
SEPT	30.3	1.01	1.4	.8	860	2.8
OCT	37.1	1.20	2.2	.8	370	2.3
NOV	38.8	1.29	1.5	1.0	-	-
DEC	43.6	1.41	2.3	1.0	340	1.3
TOTAL	430.7	-	-	-	4840	-
AVERAGE	-	1.18	-	-	-	2.8



BIOCHEMICAL OXYGEN DEMAND

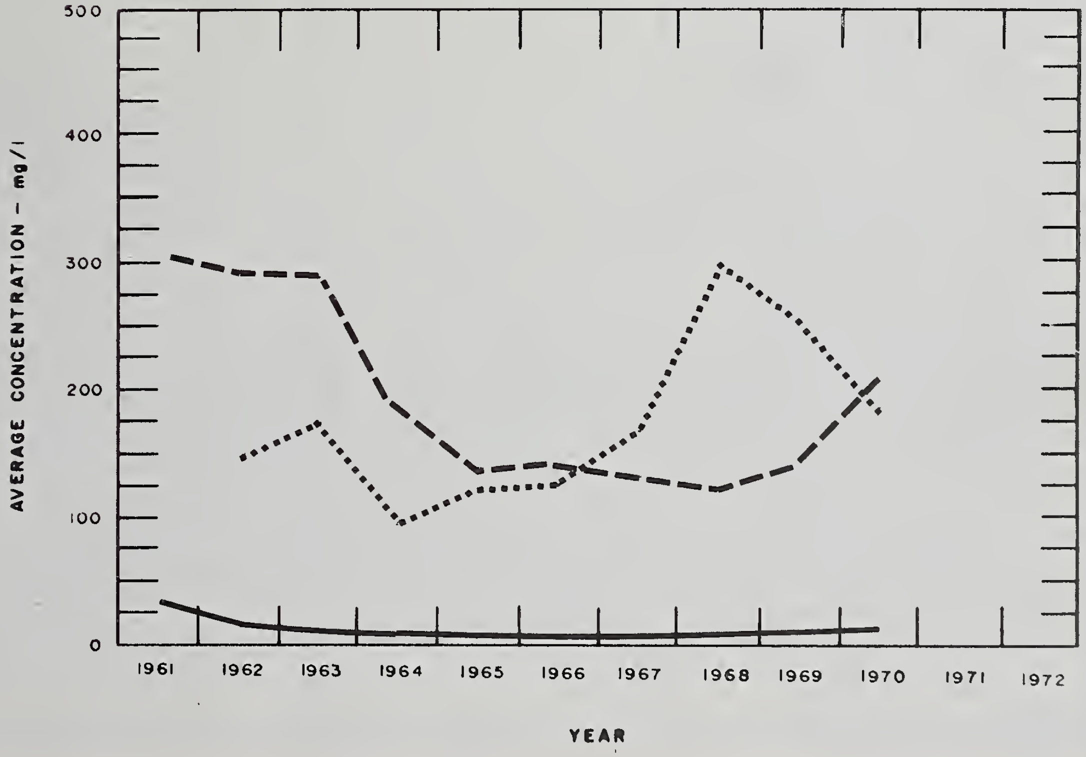
PLANT INFLUENT – – – PRIMARY EFFLUENT •••••• PLANT EFFLUENT ———





SUSPENDED SOLIDS

PLANT INFLUENT — — —   PRIMARY EFFLUENT • • • • • •   PLANT EFFLUENT ————



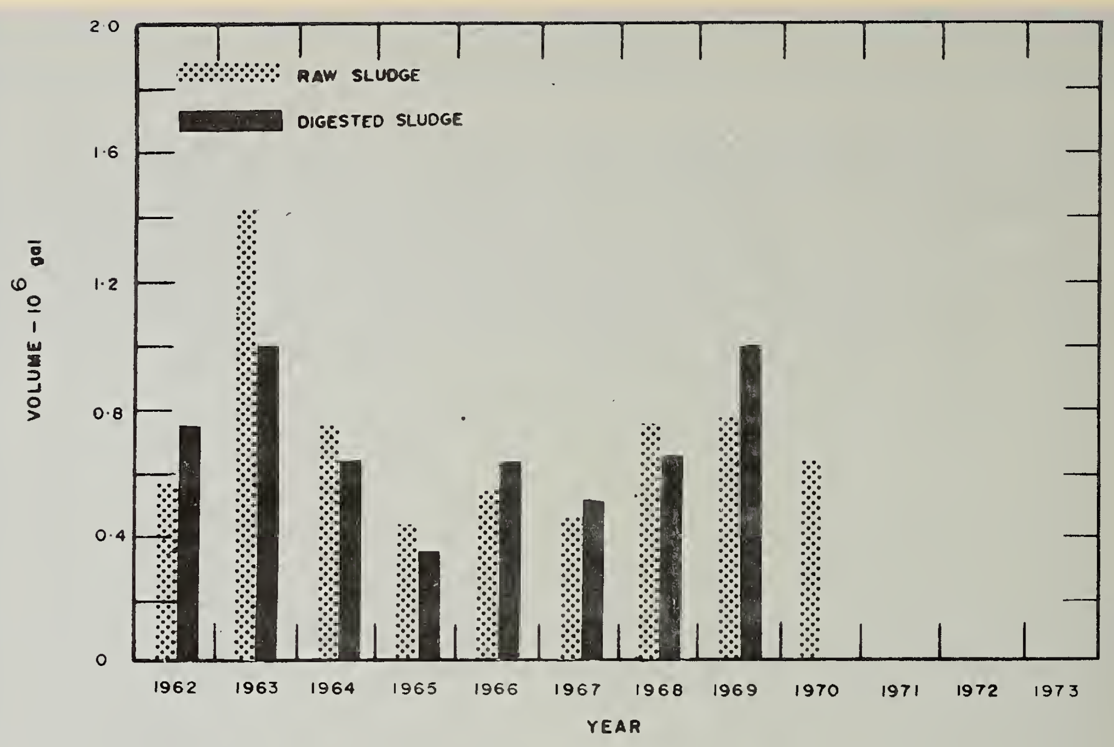
PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND						SUSPENDED SOLIDS						GRIT REMOVED
	INFLUENT		EFFLUENT		REDUCTION		INFLUENT		EFFLUENT		REDUCTION		
	n	mg/l	n	mg/l	%	10^3 pounds	n	mg/l	n	mg/l	%	10^3 pounds	cu ft
JAN	2	170	2	39	77	37	5	222	4	14	94	59	15
FEB	2	82	2	11	86	34	6	111	6	22	84	51	24
MAR	1	60	1	22	63	16	6	193	5	17	91	75	51
APR	2	63	2	15	76	22	7	155	6	18	88	64	51
MAY	2	140	2	11	92	43	6	148	6	12	92	45	35
JUNE	3	127	3	18	86	31	7	233	6	10	96	64	23
JULY	2	200	2	9	96	61	7	277	6	11	96	84	193
AUG	2	235	2	15	94	70	6	255	6	13	95	78	105
SEPT	2	125	2	7	94	36	4	197	4	9	95	57	20
OCT	2	215	2	17	92	73	6	318	6	6	98	116	38
NOV	1	190	1	30	84	62	5	192	5	9	95	71	51
DEC	3	137	3	9	93	56	7	197	7	10	95	82	42
TOTAL	24	-	24	-	-	541	72	-	67	-	-	846	648
AVERAGE	-	146	-	16	89	45	-	209	-	13	94	70	54

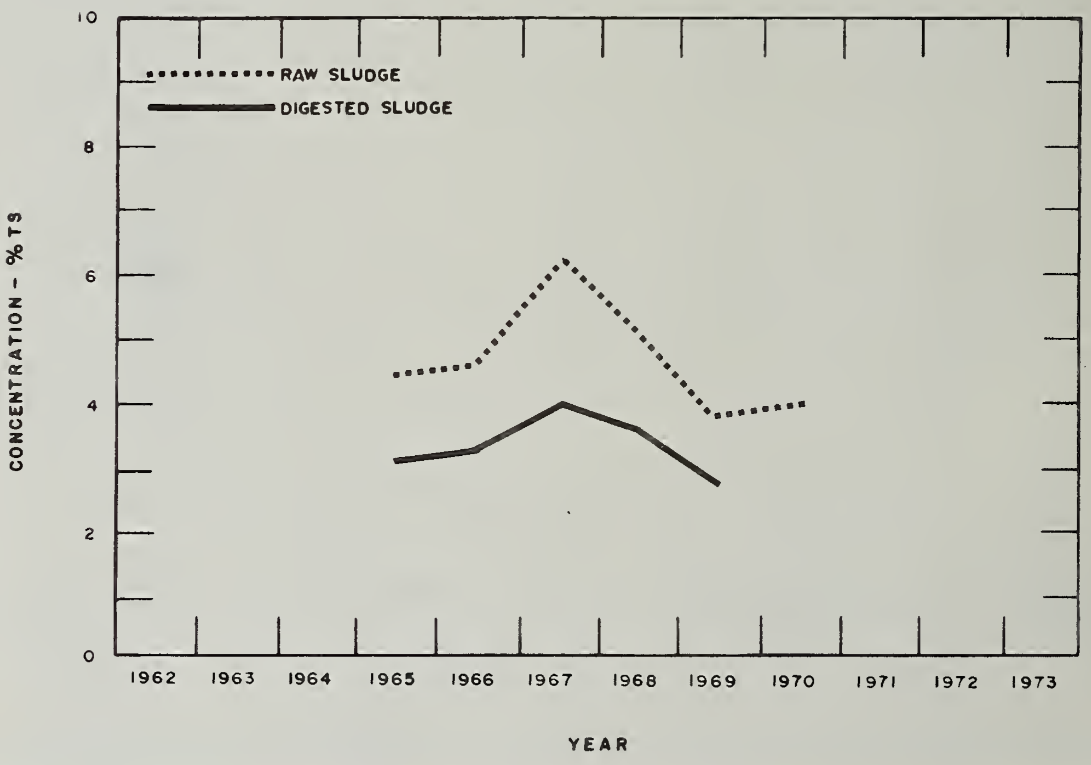
NOTE – n is the number of samples taken

AERATION

MONTH	AVG DAILY FLOW mil gal	AERATION INF.		SECONDY. EFF.		MLSS CONCN mg/l	F/M lb BOD / lb MLSS	AIR USED 1000 cu ft / lb BOD	WASTE SLUDGE lb/DAY
		BOD mg/l	SS CONCN mg/l	BOD mg/l	SS CONCN mg/l				
JAN	.91	145	143	39	14	2470	.19	2.2	0
FEB	1.32	77	134	15	25	2190	.17	2.5	2000
MAR	1.38	44	138	22	17	2510	.09	6.0	60
APR	1.55	360	263	15	18	2380	.86	.3	0
MAY	1.07	180	144	11	12	2140	.33	.8	0
JUNE	.95	107	96	18	10	2420	.15	2.3	240
JULY	1.02	205	164	9	11	2570	.30	1.0	550
AUG	1.03	189	122	15	13	2190	.32	.7	60
SEPT	1.01	122	202	7	9	2970	.15	2.0	200
OCT	1.20	137	232	17	6	3040	.20	1.5	1320
NOV	1.49	160	145	30	9	2750	.27	1.2	240
DEC	1.41	138	193	9	10	2220	.32	.9	0
TOTAL	-	-	-	-	-	-	-	-	-
AVERAGE	1.2	161	165	16	13	2490	.28	1.8	380


RAW SLUDGE
DIGESTED SLUDGE
VOLUME - 10^6 gal
2·0
1·6
1·2
0·8
0·4
0
1962
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
YEAR

DIGESTION


RAW SLUDGE
DIGESTED SLUDGE
CONCENTRATION - % TS
10
8
6
4
2
0
1962
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
YEAR

SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME 10^3 gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME 10^3 gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME 10 gal	TOTAL SOLIDS %	DEWATERED cu yd	LIQUID cu yd
JAN	55.0*	6.6	76							398
FEB	20.6	4.4	78							108
MAR	18.5	4.6	80							110
APR	27.9	3.1	77							166
MAY	58.6	5.2	79							348
JUNE	73.6	1.6	88							456
JULY	98.9	3.6	77							582
AUG	81.9	5.0	76							486
SEPT	84.9	4.6	75							504
OCT	42.6	32	80							108
NOV	39.7	3.7	71							0
DEC	24.6	2.0	69							0
TOTAL	-	-	-	190						3266
AVERAGE	-	4.0	77							327

* digester

Date Due

JUL 20 1971

ONTARIO WATER RESOURCES COMMISSION
DIVISION OF PLANT OPERATIONS.

BURLINGTON ELIZABETH GARDENS

OPERATING SUMMARY – 1970

TD227/B87/E45/W38/1970/MOE

DATE	c.1 ISSUED TO ashv.
6.7.71	A.J. HARRIS

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Ontario Water Resources Co
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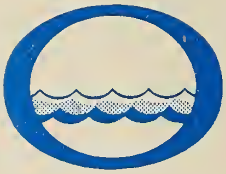

Water management in Ontario